of the nature of disease will fail to carry out the simplest directions given to them. Nothing can be a substitute for a knowledge of the first principles involved in the destruction of "poison germs" in a family attacked with contagious disease.

What, then, ought to be done in a family when scarlet fever, or any other contagious disease, has broken out? In the first place, the entire isolation of the persons attacked should be secured. They should either be removed to a room in the house to which none but the nurse and doctor have access, or the family should be removed to some house of refuge or place where the disease does not exist. It may be urged that this cannot be done; but if it be a mere question of expense, it should be considered whether the cost of the deaths, the funerals, and the doctor's bills of a family of several children, and perhaps the father or mother, may not really, in a money point of view, be greater than any cost of isolation.

But whether isolation is attempted or not, there is another set of facts which must be borne in mind. The "poison germs" of which we have spoken can really be destroyed. If left alone they can lead a life of poisonous activity. We have the means of killing them—poisoning them in their birth, as it were—by certain substances whose properties we well know. We cannot here write a history of disinfectants, but they are well known, and the advertising sheets of every newspaper will afford information with respect to them. The most common and available are carbolic acid, permanganates of soda and potash (Condy's Fluid), chlorinated lime or soda, chloride of zinc (Burnett's Fluid), chloride of aluminium (chloralum), sulphate of iron, and others. These agents have the power of destroying the poisonous activity of scarlet fever germs. In the sick-room and around the patient they should be constantly employed. All the secretions of the person affected, whether they come from the nose, the mouth, or other excretory organs, should be immediately brought in contact with one of these agents. All linen and clothes worn by the patients should be placed in a solution of one of them. Nurses attending on the sick, and medical men touching them in any way, should not leave the room without washing their hands in one of these disinfecting fluids.

Woollen clothing that cannot well be washed should, by some agency or another, be exposed to heat. It is well known that a temperature of 212° F., the temperature of boiling water, will destroy poison germs. Woollen clothing of all kinds, such as shawls and mantles, men's clothes, as also curtains, bell-pulls, carpets, rugs, and beds, should be placed in ovens, or by some contrivance or another exposed to a heat above 212°. In St. James's, Westminster, a disinfecting apparatus has been erected in the Workhouse-yard, where the various articles mentioned can be disinfected.

Having thus indicated general principles, I must leave details. I am convinced that the holocaust of victims that we annually offer to this Moloch of scarlet fever arises from ignorance, and that a general knowledge alone of the facts above stated can suffice to drive from us this plague, so disgraceful alike to our intelligence and our humanity.

E. LANKESTER

SCHIMPER'S VEGETABLE PALÆONTOLOGY

Traité de Palæontologie Végétale. Par W. Ph. Schimper. Tome ii. Première Partie, pp. 522. (Paris, 1870.)

THE first part of the second volume of this very important work (the first volume of which was reviewed in the first number of NATURE) has just appeared, with a quarto atlas of twenty-five plates; and it maintains the high character with which it commenced. In this part the systematic description of the families, genera, and species, is carried down from *Lycopodiaceæ* to the end of Monocotyledons; and the same excellent plan is carried out, of giving under each principal group its most important botanical characters and geographical distribution, drawn from living types; thus supplementing the excessively meagre descriptions that the fossils afford, enabling the reader rightly to appreciate the strength or weakness of the evidence on which the alliances of the fossils are founded, and indicating the organs or structural points most desiderated, and to obtain which collectors should search for illustrative specimens.

The following extracts and remarks will give some insight into the general nature of this volume, and illustrate the author's views as to the relations between many of the most important existing types of vegetation and their fossil representatives or allies.

Dr. Schimper ranks the great recent group of club-mosses and their allies, *Lycopodineæ*, as a class, with four subordinate families; of which two, *Lycopodieæ* and *Isoeteæ*, are abundant at the present time; the other two, *Lepidodendreæ* and *Sigillarieæ*, disappeared before the Tertiary epoch.

Under the order *Lycopodiaceæ* he includes two families: of these (1), *Lycopodieæ*, which abounds at the present day, and inhabits all latitudes from the equator to the Arctic regions, Dr. Schimper recognises only seven fossil species, all congeneric with *Lycopodium* itself, and, strange to say, confined (with the exception of one doubtful species) to the coal measures—a most remarkable fact, if capable of confirmation; but, after making every allowance for the imperfection of the geological record, it appears impossible to admit that a group so well represented now-a-days should be absent from all intervening beds, including the most modern tertiaries; and it is a startling proof either of the vagueness of the characters by which we ally our fossils to existing types, or of the imperfection of the said record. Upon the whole, and under such suspicious circumstances, we should be rather disposed to doubt the fossils being Lycopodiums at all.

Dr. Dawson's four species of this order, from the Devonian of North America, Dr. Schimper considers not to be recognisable as such; so that, little as his own data can tell us of the fossil *Lycopodineæ*, there is a lower depth of obscurity still.

Of the second family, *Lepidodendreæ*, consisting mainly of arborescent plants, all are extinct: it includes the principal genus *Lepidodendron*, with fifty-six species, all carboniferous, and with a host of synonyms, generic and specific:—*Halonia*, *Lepidoploios*, *Knorria*, and *Ulodendron*, all well known to English palæontologists. *Lepidophylla* and *Lepidostrobi* he regards as respectively leaves and fruits of some one or other of the above.

To the third family, *Isoeteæ*, which includes some fifty or sixty quill-worts and pill-worts of the temperate regions of the globe, he attributes three fossil genera; *Isoetes* itself (tertiary), and the remarkable *Psilophyton* of Dr. Dawson, which he regards as allied to *Pilularia* and not to *Psilotum*. But here again we are confronted by the suspicious fact, that nothing resembling *Psilophyton* has hitherto occurred between the Devonian and the present epoch!

The fourth family, *Sigillarieæ*, is only known in a fossil state. *Sigillaria* is the principal genus, with eighty-three species. *Stigmaria* Schimper regards as roots, but not of *Sigillaria* only, for in a supplementary note to this genus he announces the discovery of a specimen of *Knorria longifolia* (one of the *Lepidodendreæ*), the roots of which are a *Stigmaria*, the base of the stem is his own genus *Ancistrophyllum*, and the upper part is *Didymophyllum Schottini* of Göppert; thus knocking four genera into one at a blow. Add to this the fact that the leaves and organs of fructification, now unknown or unrecognised, may represent two more genera, and that there is a suspicious look of *Ulodendron* in one point of the structure, and we have as instructive an example of the condition of our knowledge of the carboniferous flora as can be desired.

Passing from Acotyledones to Cotyledones, or flowering plants, Dr. Schimper's first class is of *Cycadeæ*. They date doubtfully from the middle of the carboniferous, allowing *Noeggerathia*, &c. to belong to this alliance; in the Permian they are pretty certainly present, and they abound in the Trias and Jura formations. Of the two tribes composing this group, the *Zamieæ*, which now extend from the Old to the New World, seem to have appeared first; both these and the *Cycadeæ* proper (which are now confined to the Old World) are found in greatest abundance in the Jurassic age, whence they decline and disappear in the cretaceous, except *Zamiæ*, of which one species persists to the middle of the Tertiary epoch.

Here again, if we hold that the geological record tells a fragment of truth, we must believe that the Cycads and Zamias, which occupy so very wide an area of the globe in the present day, and whose organs and tissues are so well suited for petrifaction, had all but disappeared from the globe during the lapse of countless ages, to reappear in numbers, and that over a most extensive area.

No fewer than thirteen genera of fossil *Zamieæ* are described, and about twenty of *Cycadeæ*, including a multitude of species; both genera and species are however very badly, if at all, defined, being most fragmentary; and Dr. Schimper was of course ignorant of Mr. Carruthers' paper on the Fossil *Cycadeæ* of the secondary rocks of Great Britain, in the twenty-sixth volume of the Linnean Transactions, which throws great light on the subject. The genus *Trigonocarpus* Dr. Schimper doubtfully regards as consisting of fruits of *Cycadeæ* (describing fifteen species), together with *Rhabdocarpus* (twenty-four species), *Cardiocarpus* (twenty-one), and *Carpolithes* (nine).

Ascending in the scale of vegetable life, we come to the great group of Conifers, which seem to have presented such remarkable facilities for petrifaction in all ages from the carboniferous onwards, and which is divided into four great sections. 1. *Abietaceæ*, with four families; *Walchieæ* and *Voltzieæ*, of very doubtful affinity, if Conifers at all, and of which the one is usually placed in *Lycopodiaceæ*, and the other in *Cupressineæ*—neither have any recent representative; *Araucariæ*, comprising four extinct genera, together with *Araucaria* itself; and *Abietieæ* proper, including *Pinus* with 101 species. All appear tertiary; many are miocene, extending from Spitzbergen southwards; and, judging from the number found in single localities, as at Armissan, it would appear that either the pine-forests of those days were, unlike the present, formed of numerous species, or, what is more probable, that the supposed specific characters are worthless. Of larch, four miocene species are enumerated; of cedars, three cretaceous; of Abies, twenty-two species, all tertiary.

2. *Taxodiaceæ* form Dr. Schimper's second order of Conifers; it includes *Sequoia* with twelve species, one of which, the well-known miocene *S. Langsdorffii*, he regards, with Heer, as "almost identical with the Californian *Taxodium sempervirens*, now confined to Mexico." In its fossil state it extends from Arctic East and West America and Greenland to Bonn, Italy, and Greece. Another existing *Taxodium*, again, contains a miocene species, absolutely identical with the living *T. distichum* of the Southern States of North America, where it forms a large proportion of the arboreous vegetation of the Great Dismal Swamp. In a fossil state this also extends from Greenland and Spitzbergen to North Italy. Two other existing genera of this group, the North Chinese *Glyptostrobus*, and the South African *Widdringtonia*, are both supposed to be found in the European miocene formations.

3. Of *Cupressineæ*, to which the modern cypress, arborvitæ, juniper, and the extensive genus *Callitris* of Australia belong, there are fossil types supposed to belong to recent genera; viz. of *Libocedrus*, now confined to New Zealand and South Chili, there are two Spitzbergen and a European species, all miocene; of *Thuja*, five, all found in amber beds. To the American and Japanese White Cedars (*Chamæcyparis*) two European fossils are referred. The four junipers are a very doubtful lot.

Taxaceæ, represented throughout the northern hemisphere by one living yew, in Japan by the Maiden-hair tree (*Salisburia*), and in the tropics and south temperate regions of both the old and new worlds by various species of *Podocarpus*, have been supposed to be discovered in small numbers in a fossil state. Thus, of *Salisburia*, the existing Japanese species is believed to be found in the miocene of Greenland and near Verona, and two other American species are described—all miocene. The fossil yews are all doubtful, and the *Podocarpi*—eight in all—are probably equally so.

Gnetaceæ, to which the curious existing genus *Gnetum* (tropical), *Ephedra* (temperate), and *Welwitschia* (tropical) belong, are represented by two modern species of *Ephedra*.

The volume closes with 130 pages of Monocotyledonous fossils—a very miscellaneous and for the most part exceedingly obscure assemblage. The existence of this class in the carboniferous epoch is regarded by Dr. Schimper as not proven, and more than doubtful. In the Trias it is pretty well established by *Yuccites* and *Æthophyllum*, but there is a hiatus between that age and the Jurassic, when an obscure set of water-plants and perhaps *Pandanus* occur, to be followed by another hiatus till the cretaceous epoch, when *Gramineæ*, *Cyperaceæ*, and several of the principal orders of monocotyledons appear in some force. Whether, however, we ascend or descend in the scale of vegetable life, as represented by fossil monocotyledons, we feel the generic and even the ordinal determinations of the fossils to be throughout very doubtful, and to be reducible in most cases to the category of bold guesses. To refer the majority of living and growing monocotyledons, and especially of such orders as *Gramineæ*, *Cyperaceæ*, *Naiadeæ*, *Palmæ*, and *Liliaceæ*, to their genera from their leaves alone, is impossible; much more then from the fragmentary fossil remains of these organs. Such genera and species, however, have been made, and Dr. Schimper must sweep them into his net; and the more ungrateful the task, the more obliged we should be to him or performing it so well and so fully.

We shall look for the Dicotyledonous volume ot this great and most useful work with much interest, and lay an account of it before our readers as soon as it appears

J. D. HOOKER

THE YOSEMITE VALLEY AND THE SIERRA NEVADA OF CALIFORNIA

The Yosemite Guide-book. By J. D. Whitney. Published by authority of the Legislature of California. 1869.

MR. J. D. WHITNEY, State Geologist of California, has prepared a guide-book to the Yosemite Valley and the adjacent country, which is a model of its kind. It is well written, and is eminently lucid in its descriptions; it is amply illustrated, and has two clear maps on a large scale half a mile and two miles to the inch); and it is admirably printed (at the University Press, Cambridge, U.S.). The unpretending title of the work gives but a poor idea of its contents; botanists, geologists, and geographers will find pleasure in reading it, although it is ostensibly put forth or the sake of the ordinary tourist. It is a valuable contribution to our knowledge of the Pacific coasts of America, and throws light upon a large district which remains very imperfectly known.

The British public has been already tolerably familiarised with the most striking characteristics of the Yosemite* Valley, Mariposa County, California, by the fine picture of Mr. Bierstadt; and some excellent photographs (by Watkins, of San Francisco), which are now lying before us, show that that artist has not drawn upon his imagination. Some of our readers, however, may perhaps need to be told that it is not only a very remarkable valley, but boasts the possession of the highest waterfalls (with an equal volume of water) in the world. It is trough-shaped; a cross section of it is like the letter U, and in this respect, as well as in its length, breadth, and the steepness of its cliffs, it is comparable to the Valley of Lauterbrunnen in Switzerland, but the dimensions of its cliffs exceed those of that valley, as much as its chief waterfall (the great Yosemite Fall) surpasses the Staubbach. This magnificent cascade makes a descent of more than half a mile in sheer height, and 500,000 cubic feet of water pass over it per hour during the month of June. It is made up of two falls—an upper one, which has a vertical descent of 1,500 feet, and a lower one of 400 feet. The remainder of the total height is consumed by a series of cascades between the two; but seen from the opposite side of the valley, the effect is increased rather than diminished by the subdivision, and it well deserves all the praise which has been lavished upon it.

Mr. Whitney does not believe that the peculiar trough form of the valley has been even modified by glacier action. There are no proofs, he says, "that glaciers have ever occupied the valley, or any part of it," and he scouts the notion that it was *produced* by glacial agency. "In short," he says, "we are led irresistibly to the adoption of a theory of the origin of the Yosemite in a way which has hardly yet been recognised as one of those in which valleys may be formed, probably for the reason that there are so few cases in which such an event can be absolutely proved to have occurred. We conceive that during the process of upheaval of the Sierra, or possibly at some time after that had taken place, there was at the Yosemite a subsidence of a limited area, marked by lines of 'fault' or fissures crossing each other somewhat nearly at right angles. In other and more simple language, the bottom of the valley sank down to an unknown depth, owing to its support being withdrawn from underneath, during some of those convulsive movements which must have attended the upheaval of so extensive and elevated a chain, no matter how slow we may imagine the process to have been." It should be mentioned that the Yosemite Valley is exclusively granite, no remains of sedimentary rocks having been found within it.

Although the Yosemite Valley itself is not ice-ground, in its neighbourhood there are very emphatic traces of glacial action, and it is said that in some places the polish is so perfect upon the rocks, that "the surface is often seen from a distance to glitter with the light reflected from it, as from a mirror." It is remarkable that no glaciers are known to exist at the present time throughout the entire length of the Sierra Nevada in California. Throughout the entire region, from 35° to 42° N. lat., Mr. Whitney asserts that there is not a single glacier. Yet Mount Shasta, at the northern extreme, with a height of pretty well 15,000 feet, is more or less permanently covered with snow upon its upper 6,000 feet, and at the southern end of the district there are numerous peaks (now being surveyed) which range from 14,000 to 15,000 feet, and even higher. We confess that we do not understand how "masses of snow, several miles long, and hundreds of feet in thickness, remain all summer without showing any indication of becoming glacier ice," if they remain permanently of these dimensions; but as such seems to be the fact, there is no use in disputing it.

The most valuable portions of Mr. Whitney's book are those which he has devoted to elucidating the topography of the mountain ranges bordering upon, or in proximity to, the Pacific Coast. We learn from him in a clearer way than we have seen it put before, that there are two great ranges of mountains running throughout the length of California, which are orographically distinct. These he terms the Coast Ranges, and the Sierra Nevada. They are roughly parallel to each other, and to the coast line; and they are divided by the valleys of the Sacramento and San Joaquin rivers. The coast ranges are, geologically speaking, younger than the Sierra Nevada, and they are chiefly made up of cretaceous and tertiary strata. They are also of comparatively small elevation, and their highest summits attain only 8,000 feet. The core of the Sierra Nevada, on the other hand, is mainly granitic, flanked on both sides by metamorphic slates, and has a much greater elevation.

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* The word Yosemite means a full-grown grisly bear.